ELECTRONICS

DE LORENZO

OPEN MICROCONTROLLER DEVELOPER BASE

Flexible and modular system for the study of electronics, circuit theory and microcontroller programming.

The use of sub-boards from our BRS (Boards Reconfigurable System) product line allows performing simple but detailed practical experiments in the field of basic circuit theory, electronics, digital circuits, and microcontrollers.

The modularity of the base allows the students to create, develop and validate their own experiments and ideas and to create their own prototypes quickly and safely by using the opensource microcontroller Arduino.

The system is compatible with Windows devices, and it can be connected to a tablet or PC through the USB port.

DL OMCT

TRAINING OBJECTIVES

The trainer provides all the tools necessary for the fast prototyping of applications using basic electronic circuits and the opensource microcontroller Arduino.

The training objectives will depend on the type of applications developed by the student. The trainer can be provided with an optional set of BRS boards from the De Lorenzo product line to perform introductory experiments on:

- Analogue electronics
- Digital electronics
- Microcontrollers
- Photovoltaic solar energy

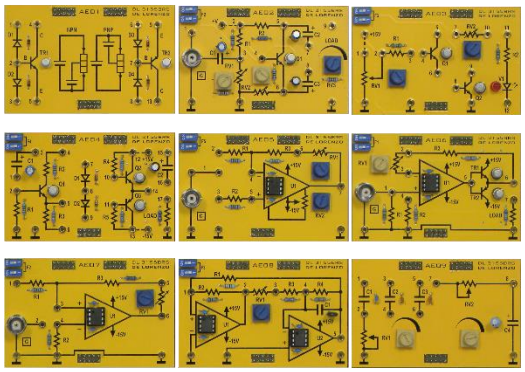
TECHNICAL FEATURES

- Power supply:
  - ± 5 Vdc, ± 15 Vdc, 1 A /
  - 0 ÷ + 15 V
  - 0 ÷ - 15 V
- Arduino UNO with ATmega328 microcontroller and IDE programming interface.
- Digital and analogue I/O interface with virtual instrumentation compatible with NI Labview:
  - Dual channel oscilloscope: 1MHz bandwidth (1µs sampling rate).
  - Function generator: Sine, square and triangular waveforms with a max. frequency of 125kHz.
  - Digital pattern generator and logic analyzer to study digital circuits.
- Multifunctional DC instrument
  - direct current voltages (range + - 50 V)
  - direct current currents (range + - 2 A)
  - direct current powers (range 100 W)

ELECTRONICS

OPTIONS

Set of modules for the study of analogue electronics
DL 3155BRS-BAE-OT

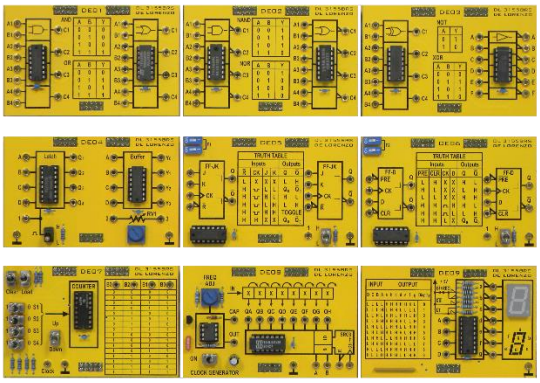


It includes: BJT amplifier, BJT-Darlington, class A and class AB push-pull circuits, operational amplifier, power operational amplifier, Schmitt trigger, square/triangular waveforms generator, 1st order high-pass/ low-pass passive filters, 1st order high-pass/ low-pass active filers (operational amplifier differentiator and integrator), 2nd order high-pass/low-pass active filters, JFET.

TRAINING OBJECTIVES

- BJT – verification of the integrity of e-b and c-b junctions.
- Common emitter circuit – DC operation: Bias Point, DC gain, AC operation.
- Driving a led load with a single bipolar junction transistor and with a Darlington transistor pair.
- Class A output stage - emitter follower circuit.
- Push-pull output stage – crossover distortion.
- Operational amplifier: reduction of the offset voltage, inverting / non-inverting, slew rate, voltage follower, voltage, and current output, coupled to pushpull booster – voltage and current output.
- Inverting / non-inverting Schmitt trigger.
- Square and triangular waveforms generation.
- Active 1st order low-pass filter, operation as an integrator, active 1st order high-pass filter, operation as a differentiator.
- Active second order low-pass and high-pass filters.
- JFET-VGS off, JFET-AC Gain, JFET – AC Bandwidth.
- Faults simulation.

Set of modules for the study of digital electronics
DL 3155BRS-BDE-OT

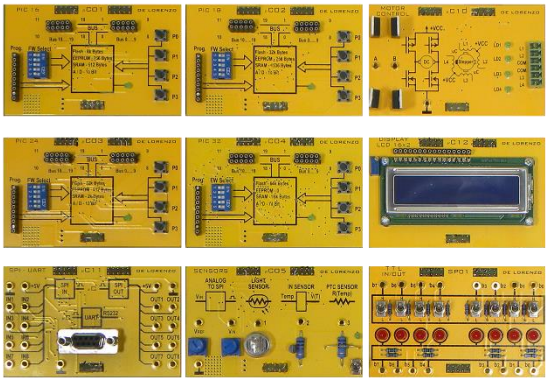


It includes AND, OR, NAND, NOR, XOR and NOT gates, latch & buffer circuit, Flip-Flop JK and D Master / Slave type, up/down counter, shift register, 7 segment display, multiplexer and demultiplexer, oscillators, 555 timer circuit.

TRAINING OBJECTIVES

- AND/OR, NAND/NOR, XOR/NOT logic gates.
- 1st and 2nd De Morgan theorem.
- Latch – DC operation.
- Buffer – DC operation.
- J-K and D flip-flop – Truth table.
- Master-slaved flip-flop.
- Basic binary UP counter.
- UP/DOWN counter.
- Serial input-parallel output shift register – 1 bit shifting.
- BCD to 7-segment led display decoder truth table.
- MUX – Multiplexing and DMUX – Demultiplexing.
- Oscillators - TTL configuration.
- Oscillators - TTL configuration with quartz.
- NE555 - astable configuration, inverting buffer and bistable Flip Flop.
- Faults simulation.

Set of modules for the study of microcontrollers
DL 3155BRS-M24-OT

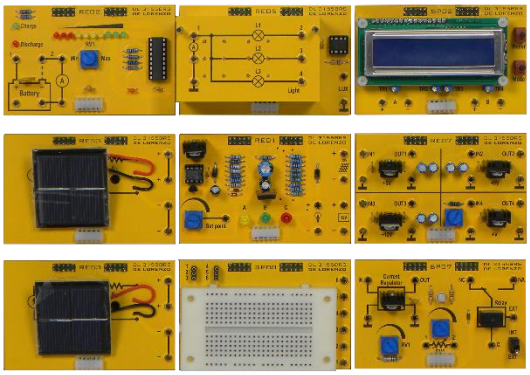


It includes PIC microcontrollers, sensors, EEPROM memory and RAM, LCD display, digital inputs / outputs, inputs / outputs TTL type, input / output optoisolator, A/D and D/A converters, motor control, SPI and UART interfaces, programmer/debugger and suggested applications programs

TRAINING OBJECTIVES

- Binary counting up to 1111.
- Activation and deactivation of one LED, LED activation by two, LED activation 1-on-1 and setting of direction and speed.
- Operation with memory, reading or writing.
- Display of values read by digital input ports, display of resistance temperature value, of PTC sensor received value, of light intensity collected by light sensor in V and display of optoisolated inputs status.
- PWM module starting after connection to 12VDC motor, speed and rotation direction change, stepper motor starting and increase or decrease of stepper speed.
- SPI and UART use in binary operation according to the decimal value set on the display, reception and transmission of characters sequence displayed in hyperterminal via RS232.

Set of modules for the study of photovoltaic solar energy
DL 3155BRS-PSE-OT



It includes photovoltaic solar cell, multifunction display, charge regulator, breadboard, battery controller with battery, light sensor, incandescent lamps and LED, voltage regulator, current regulator and relay circuit, solar panel.

TRAINING OBJECTIVES

- Electrical characteristics of a single solar cell.
- Electrical characteristics of two solar cells connected in parallel and series.
- Electrical characteristics of a solar panel.
- Monitoring of the charge level and analysis of the discharging process in a gel battery.
- Charging a battery by using a current regulator.
- Charging a battery by using a charge regulator.
- Analysis and comparison of two light sources.
- Smart system for energy management.
- Study of energy efficiency by means of a breadboard